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ONLINE LEARNING LIBRARY INITIATIVE

Printable Science Activity Ideas for Four, Five, and Six Year Olds

Note to Teachers:

- Remember that safety is the priority with any classroom activity.
- Always be aware of children's potential allergies or sensitivities to any classroom materials.
- Maintain constant supervision, especially with cooking activities or any experiment involving heat.
- Encourage exploration and discussion!

Earth Science

soil, rocks, weather, water, air, sun, moon and stars, seasons

SOIL SURVEY

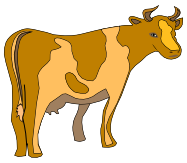
Send home plastic zip-seal bags with each child with a note asking parents to help collect a soil sample. Provide trays, small cups of water, tweezers, eyedroppers, and magnifying glasses to help children explore their samples. Look closely. Encourage comparisons.

- Make a list of things you find in the soil - rocks, twigs, trash, critters.
- Layer the different samples in a clear jar; describe the different colors.

MARVELOUS MUD

Mix soil with varying amounts of water to make mud.

- Add paper and small paint brushes to the soil exploration area. Try painting with different soils. Which soil colors the paper better?
- Use some mud to color cloth; rub into cloth or sponge paint designs.
- Take soil to playground in tubs. Mix different types together. Make mud pies and cakes with sand "sugar" on the top!



Contact Name
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MRS. WISHY WASHY

Place on a small tray

- shallow container of mud for "puddle"
- an assortment of plastic farm animals similar to ones in story (cow, pig, duck)
- small container of water for tub
- sponge
- paper towels for drying

Children can act out story by rolling animals in mud, then washing with sponge. "Into the tub you go!!" Other stories to act out with mud include *Piggy in a Puddle* and *One Duck Stuck.*

MUD AND PLASTER BRICKS

Use ½ pint milk cartons with lids cut off as molds. Mix soil and plaster with water; press into molds and allow to harden. Use these bricks as blocks on table covered with newspaper.

MYSTERY MUD

Mix mud in plastic tub. Add small plastic animals or other objects. Retrieve with tongs and rinse in another tub of clear water. Place on tray or towels to dry. Sort what you find.

EXPLORE HOW SOIL HOLDS WATER

Place different types of soil (sand, potting soil, clay) in the same size funnels. Place funnels in clear bottles or jars all the same size and shape. Pour same amount of water (¼ to ½ cup) into each funnel. Measure and compare how much water collects in each jar. Which soil let water through? Which soil "held on" to the water?

DIRT DESSERT

Crush Oreo-type sandwich cookies in plastic bags. Add crushed cookies to chocolate pudding and mix. Enjoy!

COLLECT, OBSERVE, IDENTIFY ROCKS

Have children bring rocks from home or collect on playground.

- Talk about shapes of rocks, colors, textures (rough or smooth.) Sort by size, shape, color.
- Use a simple field guide to identify some common rocks.
- Use magnifying glasses to discover many colors in one rock.
- Provide small carpet squares or paint samples in "rock colors." Try to match rocks to squares or samples.
- Create a display for rocks. Staple together ½ pint milk cartons with tops cut off, or boxes from class supplies of crayons. Place the grid in a shallow box to make it sturdier.
- Weigh and compare rocks on balance scale.

FAKE FOSSILS

Look at some real fossils imprinted in rock. Press leaves, small bones, and plastic insects into clay or Model Magic and allow to harden into "fossils."

EXPERIMENT WITH SAND AND GRAVEL

Place sand and/or gravel in sensory table or tubs. Pour through funnels or sifters. Paint some small rocks with gold paint or add gold glitter or sequins. Use playground sifters to "pan for gold." Add gravel to play dough table for building walls or other structures.

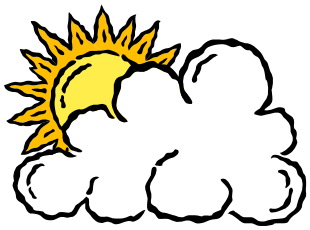
ROCKS to SOIL, SHELLS TO SAND

- On a trip to the beach collect shells and sand to show different stages of breakdown. Talk about how waves gradually crush shells to make sand. Display in plastic bags for children to explore and sequence.

- Make a match game with assorted items in whole and shredded or crushed form: coffee beans/ground coffee; wood scraps/sawdust; peppercorns/pepper; paper/confetti; shells/sand.
- Make EDIBLE SAND CASTLES: Children crush vanilla wafer "shells" with rolling pin "waves" then place in bottom of small cups. Fill with vanilla pudding and chill. Unmold and eat. May also be frozen; add a popsicle stick for holding your "sand pop."

EXPLORE SEDIMENTATION

Add gravel and/or sand to water bottles filled about ¾ full of water. Shake vigorously. Observe particles settling to bottom. Is the water cloudy? (Heavier particles fall to bottom. Sand and smaller particles are suspended in the water.)



SKY WATCH

On a day when large puffy clouds are in the sky, give children clipboards, blue paper and white chalk. Go outside and find a comfortable place to sit. Have them draw the shapes of clouds they see.

CLOUD IN A BAG

After reading *It Looked Like Spilt Milk*, place about ¼ cup of thick, white tempera paint or glarch (glue and starch) in a sturdy zip-seal bag. Have children squeeze and shape into various cloud shapes. You might also provide thinned white tempera and eye droppers. Children can drop paint onto trays and describe the cloud shapes that result.

MEASURE RAINFALL

Make a simple rain gauge by placing a large funnel inside a water bottle. NOTE: *The diameter of the funnel should be approximately 2 times the diameter of the bottom of the bottle.* Tape securely. Mark the sides of the bottle in 1" increments and label these markings ¼", ½", ¾", 1", 1¼", 1½" etc. Place the bottle in an undisturbed, open location on the playground to collect rain. Note how much rain falls.

TORNADO IN A BOTTLE

Pour water into a 2 liter plastic bottle. Add 1 teaspoon of clear liquid soap. Add 3 or 4 small tightly crumpled balls of aluminum foil. Make sure they are compressed enough to sink to the bottom of the bottle. Add 2 or 3 drops of blue food coloring. Swirl bottles and observe tornado. The crumpled foil helps the funnel last longer.

SHADOW PICTURES

Use light sensitive paper or dark construction paper for this activity. Place a variety of objects flat on the paper. Try leaves, keys, puzzle pieces, etc. You may need to secure some objects with rolled masking tape. Place the paper with the objects in direct sunlight for several minutes (light sensitive paper) to several hours (construction paper). Remove objects and observe.

HOT PAPER!

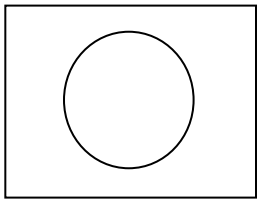
Place sheets of black and white construction paper in direct sunlight. After one hour, feel both sheets of paper. Which is hottest? Why? (The dark paper absorbs heat from the sun; the light paper reflects it.)

MINI PLANETARIUM

To make the planetarium or star viewer, collect toilet tissue tubes or snack cans. Cover the end of the toilet tissue tubes with black paper. Cut the closed end off the snack can to make a tube, paint the lid black, and replace it. Punch small holes in the construction paper or the lid. Hold the tubes up to the light and look through the open end to "see the stars."

MOON WATCH

Do this activity at a time when the moon is visible early in the evening. Show children pictures of different phases of the moon - full, half, crescent. Explain that you will be conducting a moon watch. Send home cards each day with a circle about the size of a quarter drawn on them. In the accompanying note to parents, explain that the child is to



color the circle to match the shape of the moon that he/she sees. The next day at school, ask several volunteers to show their moon pictures, then put up one on the moon watch chart. As the days go by, ask the children to predict if the part of the moon we can see is getting bigger or smaller.

WATER, WATER EVERYWHERE

Children love to play in water! Take advantage of their natural enthusiasm with these water activities:

- Provide an assortment of doll or baby clothes, tubs, clotheslines and pins. Children "wash" clothes and hang on line to dry. Talk about what happens to water. Which clothes dry faster? How does the sun help?
- Use sponges and squeegees to clean windows.
- Give children an assortment of sponges - natural and synthetic - and let them experiment with soaking up water and squeezing it out. Provide some cups to catch the water and measure it.
- Freeze water in large blocks of different shapes and sizes. Provide children with salt to sprinkle on surfaces. Can they "glue" blocks together?
- Poke several pinholes around bottom of plastic water bottles. Fill bottles and screw cap on tightly; water should stop coming through holes. To release water, unscrew cap slightly.
- "Paint" with water on the chalkboard; on a wooden fence; on playground pavement.

BUBBLES AND BURPS

Give children basters, plastic water bottles and water tubs. Show them how to squeeze basters to make bubbles in water. Lower the water bottles straight down into water (top first) and then turn them sideways to make them "burp." What made the bubbles? (air)

OCEAN in a BOTTLE

In an empty plastic bottle, mix equal parts of water and mineral oil, each colored a different color. You may color the water with regular food coloring or liquid watercolor. The oil requires an oil-based color. (After Easter you can find oil-based colors for dying eggs on sale.) As children move and shake the bottle, the oil and water form interesting waves and patterns. When the bottle is still, the oil and water separate again.

WATER WORKS

This is an ambitious outdoor project. Provide children with lengths of plastic pipe and connectors, along with a water source from a hose. Challenge them to construct a "water works" that will transfer water from one area of the playground to the other.

SINK and FLOAT

This popular activity never grows old!

- Provide tubs of water and a variety of things that sink or float for children to explore.
- Sort and classify objects (sink or float?).
- Act out *Who Sank the Boat?* with small boats and plastic farm animals.
- Put items you want to observe in plastic water bottles labeled with the name of the item. Children can shake bottles, observe whether the item sinks or floats, and record their observations without getting everything wet.
- Ask children to figure out how to make something that sinks, float. And something that floats, sink!
- After lots of experimenting, bring in new objects and ask children to *predict* which will sink or float.
- Try placing objects in salt water or corn syrup. Does it make a difference?

SUPER SOAKERS

Fill egg carton cups with different items that may or may not soak up water - cotton balls, paper towels, piece of sponge, fabric squares, Styrofoam, wood chips, marbles, small LEGOS, etc. Give children eyedroppers and water. Squeeze water into sections and observe what happens.

STRAW FUN

- Give children straws and an assortment of objects to blow across a tabletop. Which goes fastest?
- Provide a shoe box lid filled with an assortment of paper cut into squares - tissue, foil, cardboard, construction paper. Try to pick up paper with straw using suction and transfer it to an empty shoe box lid.
- Place thinned tempera paint on slick paper (like finger-paint paper). Blow through a straw to cause paint to spread out into designs.

MAKE WINDSOCKS AND KITES

- Decorate a 9 x 12 piece of construction paper. Roll into a cylinder and staple or tape. Add crepe paper or tissue streamers. Hang outside to catch the breeze.
- Make a simple kite by cutting off the bottom of a small lunch sack. Add streamers of crepe paper or tissue to one end and attach a string to the other end. These kites are easy to fly even on days when there is not a lot of wind.

PHYSICAL SCIENCE

matter, magnets, color and light, machines, electricity, chemistry

OBSERVE CHANGES IN MATTER

Cooking is a perfect way for children to observe basic changes in matter - from solid to liquid, from wet to dry, from light to dark. Food is an instant attention-getter and children eagerly come to the science center to join in the fun! Here are some tried and true favorites.

- **CINNAMON APPLESAUCE**: Heat applesauce in slow cooker until warm. Taste and describe. Add a few cinnamon candies and stir. Observe changes in color. Taste and describe.
- **CHOCOLATE SHAPES**: Provide each child with a Hershey's kiss. Observe/describe/draw shape. Use a crockpot liner (available in near foil and wax paper at grocery store) and warm several kisses in the crockpot on low heat. What happens? Pour melted chocolate on waxed paper. Observe/describe/draw new shape. Break into pieces and eat.
- **HOT CHOCOLATE**: Heat milk in slow cooker or on stove. Pour into Styrofoam cups. Add chocolate syrup or powdered cocoa mix. Stir and observe. Provide vocabulary: "dissolving." Add 2-3 mini marshmallows. Observe. Did they dissolve? Cool to safe drinking temperature before consuming.
- **POPCORN**: Give each child several kernels of popcorn. Observe/describe/draw. Talk about how much space is taken up by the kernels. Pop corn in hot air popper. Give each child a handful of popcorn. Observe/describe/draw. How much space does the popcorn take up now?
- **SCRAMBLED EGGS**: Allow each child to crack egg into bowl and observe. Use words to describe texture - slimy, runny, gooey. Have each child scramble egg, then pour together and teacher cooks in electric skillet or wok. Watch as eggs change from liquid to solid. Cool, eat and enjoy. LATER provide children with picture cards to sequence that describe process: "CRACK, BEAT, COOK, EAT"

BAG TWIST

Explore the concept of stored energy with this lively activity.

Collect several plastic grocery store bags (or use socks). Place items in the bag and twist handles a number of times in one direction. Release bags and watch them twirl. Does a heavy item twirl differently from a lighter one? Can you make the bag untwist and twist back?

BRIGHT AS A PENNY

Here is a fun way to explore chemical reactions. Provide children with a small amount of vinegar, some salt, an old toothbrush, some water, and some old pennies. Invite them to use the materials in whatever way they choose to clean the pennies. When they mix the vinegar and salt, the resulting chemical reaction will turn those dull pennies bright and shiny!

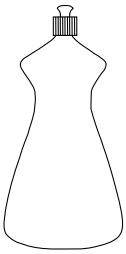
PHYSICS 101

While Pre-K children cannot understand the "whys" of buoyancy, density, surface tension, or atmospheric pressure, they CAN have fun with some of these classic experiments.

PEPPER CHASE

Place water in a shallow cake pan and sprinkle pepper on the top of the water. What happens? (it floats) Touch your finger to some liquid soap and then touch the water. What happens? (pepper "runs away") Place a sugar cube in the water in a slightly different spot. The pepper "comes back!" Try with small pieces of broken toothpicks or cinnamon.
NOTE: The soap film weakens surface tension and repels water; the sugar absorbs water and creates tiny currents that cause the pepper to be drawn in.

DANCING DROPPERS



Fill a clear plastic squeeze bottle with water ¾ full. Fill a dropper with water so that it floats upright. Place the dropper in the bottle and screw on the cap.
Squeeze the bottle and watch what happens. As you increase the pressure in the bottle, water flows into the dropper and it sinks.

WATER BRIDGE

Fill one cup half full of water and place it side by side with an empty glass. Cut a strip of paper towel and make a "bridge" between the two glasses, with each end of the towel in one of the cups. Will water travel across the bridge to the other glass? Watch!

DANCING RAISINS

Place raisins in a plastic water bottle filled with carbonated water, also called "seltzer." Watch as they first sink to the bottom and then float to the top. As the bubbles of carbon dioxide gas stick to each raisin, it becomes light enough to float. When the bubbles burst at the surface of the liquid, the raisins sink again. Try this with small pieces of Styrofoam packing material, too.

LIQUID LAYERS

Obtain a large plastic juice jug. Fill 1/3 full with water colored with blue food color. Slowly pour in light corn syrup (an equal amount to the water.) The corn syrup sinks to the bottom. Then add an equal amount of vegetable oil. It will float on top. Then drop in a variety of items - a penny, LEGOS, wooden pegs, paper clips, confetti, etc. Where do they float? (They will float on the layer that is comparable in density - some on the corn syrup, some on the water, and some on the oil!)

MINI LAVA LAMP

You'll need

- A glass jar or drinking glass
- Vegetable oil
- Salt or Alka Seltzer
- Water
- Food coloring

Pour about 3 inches of water into the jar. Pour about 1/3 cup of vegetable oil into the jar. When everything settles, look to see if the oil is on top of the water, or underneath it. Now you can add one drop of food coloring to the jar. What happens? Is the drop in the oil or in the water? Does the color spread? Now shake salt on top of the oil while you count slowly to 5. Observe what happens to the food coloring and what happens to the salt. Add more salt to keep the action going for as long as you want. (Alka Seltzer can be substituted for the salt …just pay close attention to the reaction, and add goggles!!!)

MAGNET ACTIVITIES:

- Rub a magnet on a nail or screwdriver to turn that object into a magnet.
- Hide metal objects in sand and use a magnet to uncover them.
- Use a magnet to draw a metal toy car through shaving cream.
- Mix iron filings in sand and use a magnet to separate the iron from the sand.
- Do magnets work in water? Find out with water, metal objects and magnets!

MAGNET ILLUSION: Tie a paper clip on a piece of thread. Tape the end of the thread without the paper clip to the table top. Hold a magnet near the paper clip to create the illusion of a paper clip floating in mid air.

YES AND NO BOARD: Use this with any experiment. Divide a piece of paper in half horizontally. Write YES on one side, and NO on the other. Ask a question such as, "Does it stick?" or "Does it float?" Set up the experiment so children can predict and record observations by placing objects on the correct side of the board.

COLOR BLENDING AND SEPARATING

CAPILLARY ACTION: Draw with washable markers on a coffee filter. Make a wick out of a paper towel by rolling it up like a pencil, or you can also use a pipe cleaner. Tear a small hole in the center of the decorated coffee filter and insert the wick. Drape the coffee filter over the top of a cup filled with 3 inches of water. The other end of the wick should be in the water. Observe as the water travels up the wick to the coffee filter and see what happens to the colors!

DIFFUSING COLORS: Ask children to predict what will happen when you put an almost dried up washable marker in a jar of water. Observe what takes place. Try two markers and two jars using hot and cold water for a variation.

COLOR BOTTLES: Collect 6 water bottles of the same size and shape. Fill each with water and let settle. Add 1 drop of food coloring to the first bottle. To the next bottle add 2 drops of the same color; then three drops to the next and so on. Mix up the bottles and arrange them in order from light to dark.

EASY TIE-DYE: You will need some Sharpie markers, a plastic cup, a rubber band, some rubbing alcohol, a washed cotton handkerchief or t- shirt, and a pipette (plastic dropper). Place the open end of the cup under the handkerchief and pull the cloth tight over the cup. Secure with a rubber band. Use the Sharpies to draw dots on the cloth. Then suck up

rubbing alcohol in the pipette and drip the alcohol, one drop at a time, into the center of your design and watch. Keep dripping alcohol on the dots until you get your desired result. Really cool!

COLOR MIXING

Give children lots of opportunities to experiment with mixing colors. Here's a good introductory activity for 4-5 children.

Provide each child with a plastic tub. Place another tub in the center of the table (this works best at a round table). Place 3 containers of colored water in each child's tub. Also provide a dropper or a small scoop (ones from baby formula work well) and a small plastic mixing cup with a handle for easy pouring. Have the children mix the colored water in the cups and observe.

Then the children pour the water into the center tub and mix another color.

COLORFUL COFFEE FILTERS

Provide coffee filters, droppers and small containers of diluted food color or liquid watercolor. Children drop colors on to paper and watch as they mix together to form new colors. Try this with paper towels, too. Make a display of COLOR CIRCLES and SQUARES.

MARBLE PAINTING

Try this variation of a favorite activity. You will need: red paint, white paint, white paper, shallow trays, 12 marbles.
Begin by placing all 12 marbles into red paint. Swirl on paper and observe color that results.
Next try 6 red and 6 white marbles. Observe color.
Experiment with different combinations of marbles. Soon the children will be saying things like, "I want to make really light pink. I need 10 white and 2 red marbles."
Arrange several of the paintings in sequence, light to dark, and ask children to tell which ones had more red marbles...more white? Can they guess the combination?
Try different colors - blue, purple, green

COLOR DANCE

Give each child a plastic color paddle (or make some with acetate film and cardboard). Play some dance music and have children move around the room. When the music stops, find a partner and place your paddles together. What color did you make?

COLOR PANELS

Yet another way to experiment with color mixing - AND a cool wall display.

- Obtain a large Styrofoam panel that has protected furniture in shipping. It should fit on your art table or other surface in your classroom so that children can comfortably reach the middle.
- Use masking tape to mark the panel into a grid with spaces about 1½ to 2" square.
- Provide the children with a Styrofoam plate "palette" which contains dime-size drops of 3 colors of tempera paint. The colors you choose will determine the look of the finished panel. For example: red, yellow and white will result in a panel that contains pink, cream, peach and orange, as well as the original colors.
- Show the children how to use a brush to pick up a little color and move it to a clean part of the palette. Then move another color and mix them together. When you get a new color, paint it in a square. Repeat until the panel is full.

RAINBOW IN A JAR

Obtain a large, clear jar from a deli or the school kitchen. Fill with water and let settle overnight to minimize currents. Drop several drops of 3 different food colors into the jar, one right after the other. Watch as the colors move and mix together. This is especially dramatic if the lights are off and a light is shining on the jar.

GLITTER PLATES: Brush white glue on a paper plate and add large shiny confetti glitter. Once dry, shine a flashlight on the glitter plate and it will reflect the lights on the wall.

DANCING FEATHERS: Place a piece of thin Plexiglas on two blocks so you can put some feathers or tissue paper strips on the table underneath it. Rub the Plexiglas quickly with wool and watch the feathers begin to dance.

WATER BOTTLE AND STYROFOAM PELLETS: Fill a clean and dry water bottle with Styrofoam pellets and put the top on the bottle tightly. Use a wool cloth and rub quickly on the out side of the bottle. Put your fingers on the bottle and watch the pellets jump away from your fingers.

VOLCANOES: Use baking soda and vinegar. For a bigger bubble add a drop of Dawn dishwashing detergent to the vinegar. Set this experiment up with a cup of vinegar and a pipette, a cup of baking soda with a tasting spoon from and ice cream store, and a test tube or film canister for mixing the ingredients. Also provide a "trash cup" to pour the mixture in

after it stops reacting. This is also fun to do in the sandbox. Have the children build a big mountain in the sand and fill the top of the volcano with lots of baking soda. Use vinegar squirted from a ketchup bottle to cause the reaction.

FLOATING M&M'S: Fill a bowl with an inch or two of water. Place a few m&m's with the "m" side up into the bowl. Don't stir, just observe. Predict what will happen. Keep your eye on the "m!" Notice that the colors won't mix unless you move the bowl. (Each color has a different density.)

RUBBER BALLS: 1 tbsp. white glue 1 ½ tsp. Borax
Craft stick for stirring 2 3-oz paper cups
Zip-seal bag for storing Water

1. Pour 1 tbsp. of white glue in to the first cup. Add 1 tbsp. of water and stir with craft stick until mixed, then set aside.
2. In the second cup, mix 1.5 tsp. of Borax with 4 tbsp. of water. Stir well, then BEFORE it settles to the bottom, scoop out ONLY one tbsp. of the water/Borax mixture and pour it into the cup that has the glue mixture.
3. Stir with a stick. If the mixture does not quickly form a gel add one more tablespoon of Borax mixture and stir again.
4. Remove from cup and roll in hands until substance firms up.

ALKA-SELTZER ROCKETS: You need water, Alka -Seltzer and a film canister. Fill the canister one-third of the way with water. And one quarter of an Alka- Seltzer tablet, then quickly put the lid on tightly. Place the canister, lid down, on a table and step back. The gas released from the tablet fills the canister and BOOM!

EXPANDING LUNCH BAG: Put a teaspoon of baking soda in the middle of a toilet paper square. Fold it up and place it in a zip-seal sandwich bag. Fill the bag with about two inches of vinegar and zip it up FAST! Don't let any air escape! Really cool!

INSTA-SNOW (Can be ordered from Steve Spangler Science): Try this twist on the snow: Make the snow with water that has been colored with food coloring. After you have played with it, sprinkle salt on it and watch it melt.

SINK AND FLOAT CRAYONS: Take a box of Crayola crayons and drop them, one at a time, into a big bowl of water. Predict if they will sink or float. Some will sink and some will float, probably because some have more air in them than others.

ALUMINUM BOATS: Cut 8 inch squares out of aluminum foil. Have children form the aluminum foil around the bottom of a cup, then remove the cup. This makes the boat. Float the aluminum boat in a bin of water, and gently place pennies in the boat. Count how many it takes to sink the boat.

COUNTING COTTON: Fill a cup with water to the top and ask children to predict how many cotton balls can be put in the glass before the water spills out. Now, using tweezers,

gently put each ball in separately and watch the ball absorb the water. How many did it take?

EXPLODING DOTS

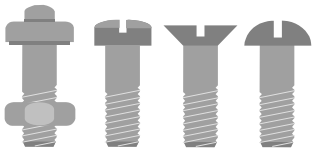
Watch the reaction between vinegar and baking soda!

- Spread baking soda over the entire area of a large aluminum baking pan. (Make sure that there is a layer of baking soda covering the entire pan.)
- Pour vinegar into a small cup.
- Then put two drops of food coloring into the cup.
- Fill the dropper with the vinegar.
- Drop dots of the vinegar into one spot in the pan. **Watch the reaction!!** This can be repeated in different spots to watch the reaction over and over and over again.

STRONG PAPER

Show how changing the shape of something can make it stronger

- Demonstrate how a sheet of paper "flops over" when it is held upright by the bottom edge.
- Look at a fan. What is different about this paper? (folded) Show children how to fold paper so it will stand up. You might want to make and decorate your own fans.
- Try to support a wooden block on a plain sheet of paper. Then try folding the paper. What happens? Look "inside" corrugated cardboard. Why do you think there are folds inside?
- Use folded paper in block area as part of constructions. Try rolling paper into tubes and taping. These can be used to build whole structures.



SCIENCE "PUZZLES"

Provide children with things that they can fit together or take apart & put back together

- Collect an assortment of plastic bottles and jars, along with their lids. Children screw matching lid on jar.
- Provide large nuts, bolts and washers for children to put together.
- Purchase a variety of locks and keys from the Dollar Store. At first, attach keys to locks so that the right key is at hand and the experience is about opening the lock.

After a time, you might try separating several keys and locks, so that it becomes a real puzzle.

- Show children the parts to a flashlight: how the batteries fit inside, how the springs work, etc. Provide a flashlight to take apart and put back together. For beginners, tape or glue the lens cap on to prevent the bulb from falling out.

TOOL TIME

Give children opportunities to practice using tools. Remember: a tool is *any device that helps you perform a task.*

- Provide tubs of soapy water. Use egg beaters or wire whisks to make mountains of suds.
- Provide an assortment of containers and things that fit inside: ice trays and plastic fruit, small bottles and beans, etc. Use tongs, tweezers or chopsticks to pick them up.
- Try hammering wooden pegs or golf tees into Styrofoam blocks as a prelude to real hammers and nails.

ARCHITECT DRAWINGS

Show children architectural plans and explain that before buildings or other structures are built, someone draws a picture of how it will look. Then try this LEGO activity.

- Cut old architect plans into 8 x 10" pieces for children to draw on.
- Provide plan paper and "LEGO markers" (red, green, yellow, red, blue and black)
- Children draw plans of the LEGO structures they create. Then, other children can try to duplicate the structures using the plans.
- Place the "plan paper" in the block center for drawing structures

EXPLORE MAGNETS

Try these additions to the magnet experience.

- Provide a quantity of paper clips. How many can you pick up? Can you make them "jump up" towards the magnet?
- Place clips inside a plastic water bottle. Will the magnet pick them up? Can you hold up the bottle? What if you add sand...does the magnet attract the sand?

- Use metal lids with smooth edges (from juice cans, refrigerated biscuits, etc) Will the lids stick together? Will they jump up?
- Use the lids and clips together. What structures can you make?
- Place colored paper clips in sand tub. Search with magnet wands for "treasure."
- Make an obstacle course with a shallow box or sturdy lid. Draw a path for the paper clips to navigate. Use a heavy magnet placed under the box to move the paper clips along the course.
- Use a cake pan or box lid to hold paper. Place some paint on the paper and several small objects that a magnet will attract. Hold a magnet under the lid and paint by dragging the objects through the paint.

RACE CAR FUN

Children are able to explore a wealth of physical science concepts with this simple activity - angle, friction, movement, velocity.

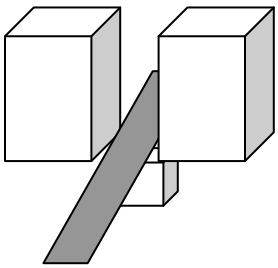
Easily create some small ramps with heavy cardboard and 4 regular clothespins. Attach two clothespins to one end of the cardboard; then attach 2 additional clothespins at right angles to the first two.
Provide small cars and other wheeled vehicles to race down the ramps. Mark distances on the floor or tabletop with tape. Which cars go the furthest?
Try placing different materials at the base of the ramp - carpet squares, sandpaper, etc. What happens to the cars then?
Move the action to the playground or block center and build even bigger ramps. Try sending a variety of objects down the slide – plastic blocks, playground balls, small cars, pieces of construction paper. What slows the cars down? What causes them to speed up?

HANGER MOBILE

Explore the concept of balance with an assortment of inexpensive plastic coat hangers. Suspend one hanger from the ceiling, several feet above the floor. Place the other hangers nearby. Invite children to "hook the hangers together." This activity will change every day as the children figure out new and interesting ways to balance their sculpture.

HOMEMADE BALANCE

Use wooden blocks and a ruler or paint stick to make a simple "see-saw" balance. Encourage children to experiment with different objects in the classroom - Unifix cubes, small cars, rocks, LEGO people, etc. - to discover which things are heavier and lighter.
You will need two tall blocks and one shorter one. The tall blocks keep the ruler in place while allowing it to move freely. Tape the blocks to each other and/or to the table. Place a ruler or paint stick between the blocks. Mark the center of the stick, but don't tape it down. The children may want to experiment with where the ruler is placed and how it affects the balance.



LIFE SCIENCE

plants, animals, environment

LEAF PRINTS

Study the shape and structure of leaves by making leaf prints or rubbings.

- For very clear rubbings, stick the flattened leaves to a clipboard or heavy piece of cardboard with clear contact paper. Clip the paper to the board and rub away!
- Glue pressed leaves on to Styrofoam blocks; use "as is" for printing or cut around the shape of the leaf with a craft knife. Use large stamp pads or color backs of leaves with magic markers
- Press leaves into play dough, clay, or Model Magic to make prints.

POUNDED LEAVES and FLOWERS

Here's a fun...and loud! ... way to make impressions of leaves or flowers.

Choose a colorful leaf or flower and flatten it out completely. You may have to remove the center portion of the flower or the stem of the leaf.

Place the leaf on a cutting board or other wooden surface and tape down.

Cover with paper.

Use a small hammer or mallet to gently pound the leaf until you see color coming through the paper.
Remove the paper and peel off any bits of leaf.
Try with small squares of cloth as well. Which works best?

"LET'S PLAY SEEDS!"

Act out the process of plants growing during large group.
Preparation: Give each child a small piece of cereal. Turn out lights and have children kneel, then bend their bodies over with arms folded over head. Begin your story.

> "Once a teacher planted some tiny seeds in the dark, dark ground. The seeds were so still...waiting..... and waiting....and waiting.

Then the rain fell on the soil (lightly mist children with water from sprayer) and the seeds used the food they had stored inside (children eat cereal) to get nourishment.
Then, up poked one tiny leaf through the soil (whisper to children to lift one arm).
And then up poked the other leaf (arm). And up poked the top of the plant (whisper to children to lift heads and kneel upright) - up through the soil.
There was sunshine (turn on the lights) shining on the little plants and they grew warm.
And then the rain fell down and the thirsty roots sucked it up (mist more water).
The little seeds stretched their stems and leaves and grew up, up, up (whisper to children to stand) to the sky!
They swayed gently in the breeze, but their roots held them down. (children sway).
They caught the sunlight on their leaves and made their own food ("catch" sunlight with hands). They felt the rain fall down some more.
And they were happy because they were strong and beautiful plants."

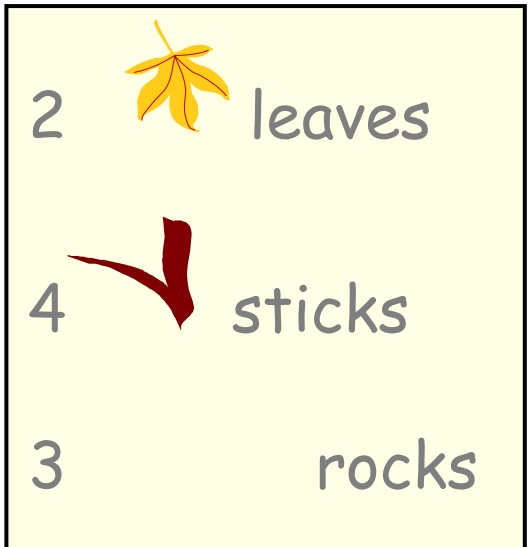
WHAT DO LEAVES DO?

Leaves release moisture into the air in a process called transpiration. This moisture cleans the air of dust and pollution. Help children act out this important function of leaves - to "clean" the air. Have the children make leaf headbands by gluing paper leaves to a strip of paper, which you can staple into a circle. Talk about how leaves release water that helps clean the air.

Provide the children with water sprayers and go outside. The children will enjoy running around, spraying the air clean!

WATCH IT WORK

Using an indoor plant or one on the playground, show children the water that leaves release. Securely fasten a plastic bag over leaves on the branch. After a time, observe the water that has collected.



MORE OUTSIDE FUN

- Line up several children on one side of the play space. Give each child a leaf, a stick, a rock, etc. On the other side, lay out the matching items. To play the game, the children run over, find the match to the item they are holding and race back. Then the next person goes until all have had a turn.

- Have a nature scavenger hunt. Give each child a bag with a list inside that details the items he/she should find.

- Have a sock walk to collect seeds. This activity works best in the fall, when seeds are abundant. Cover children's shoes with LARGE tube socks. Go for a walk in the grassy areas surrounding your play space. Come back to class and pick off any "travelers" that are sticking to the socks. Talk about how the seeds hook on to people and animals and travel from place to place.

SHRINK A PINE CONE

Show children large, fat cone from pine tree. Ask what will happen if the cone is placed in water. Record answers on chart paper. Place cone in water and wait 2-3 hours. As the cone absorbs water, it closes tightly. "It got skinny!" say the children. Ask what will happen if we take it out of the water. Record predictions. As the cone dries out (this takes several days!), it will open again. (Cones close tightly to protect the seeds inside from moisture.)

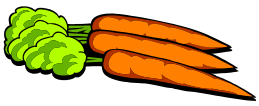
WHAT WILL GROW?

Encourage children to wonder about what will grow from a particular seed. Plant seeds from apples and oranges you eat at snack time. Plant birdseed and count the different plants that grow. Examine gerbil food. Talk about the different types of seeds it contains (corn, pumpkin, sunflower). Are there seeds that we eat?

THE GREEN GRASS GREW ALL AROUND

Plant grass seed in a variety of places:

- Place grass seed in the toe of a hosiery knee-high Add soil to make a ball and tie hose shut. Sprinkle liberally with water. Seed will grow through hose.
- Hollow out the top of a potato. Put grass seed inside, then water.
- Sprinkle grass seed on soil, on several thicknesses of newspaper, and on a sponge that DOES NOT have added soap in it. Ask children to predict where the grass seed will grow by writing their names in one of 3 columns on a poster board. (Put a bag with soil in it at the top of one column, a piece of newspaper at the top of the second column, and a sponge at the top of the third column.) Although the grass seed in the soil will usually sprout first, the seed will eventually grow on all three surfaces. After seeds sprout, children can draw pictures of the results of their experiment.



ROOTS AND STEMS

- Read *Tops and Bottoms.* Taste a variety of roots and stems (carrots, celery, potatoes).

- Carefully remove soil from potted plant to observe root structure. Root cuttings in water.
- Pull strings from celery. Talk about how water travels up the strings to the leaves. Place celery in colored water to observe this process
- Make paper flowers to fit over end of straw and leaves to wrap around it. Drink through straw and suck water up to the flower.

WEAVE A WEB

Provide children with small dark-colored paper plates and white string. Pre-cut slits around the outside of the plate. Children weave string through slits, back and forth, across and around plate to form a web.

HABITAT TRAYS

Help children learn about animals and their habitats by creating a variety of habitat trays. Use a shallow tray about 2 inches deep, found at the dollar store. Fill the tray with soil or sand or water; add leaves or rocks. Provide a variety of small plastic animals that occupy the specific habitat. As children play with the animals, making them swim through the water or hide under the rocks; they solidify their knowledge of how those animals live. Here are some examples:

- POND: water, lily pads cut from craft foam or large leaves, a rock or two, plastic frogs, insects, ducks, etc.
- DESERT: sand, rocks, maybe a small plastic cactus (not too prickly!), snakes, lizards, coyote, rabbits.
- GRASS: Fill tray with soil. Liberally sprinkle with grass seed and water. When it's about 1" high, add animals that feed on grass (horse, cow, zebra).
- FOREST FLOOR: sandy soil, leaves, twigs, nuts, pine straw, pine cones, rocks. Add spiders, squirrels, raccoons.
- POLAR: water, ice cubes, Styrofoam "icebergs," seals, walrus, polar bears, whales.

KEEP IT REAL

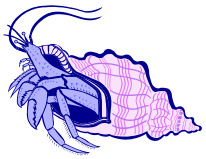
Make sure you always have live animals for the children to observe. Every classroom should have a fish - they're easy to care for and relaxing to watch. Hermit crabs are good, too.

Many small critters don't object to a day spent in the classroom, so bring in worms or crickets or "daddy long legs" for the children to watch. Talk about being gentle and always let the critters go at the end of the day.

LIVE MODELS are essential for careful, detailed observations. You will be amazed at the detail of drawings done while looking at the real thing! If you can't provide a live model, give the children realistic plastic models to study and draw. Don't ask a pre-K child to draw something he/she can't see!

PILL BUG PLAYGROUND

Create a temporary habitat for pill bugs (roly pollies) in a fish bowl. Dig up these tiny crustaceans (correctly called Isopods) from under rocks or next to the foundation of your house. Place them in the bowl along with some sticks, soil and fallen leaves. Watch as the pill bugs crawl about, turning over the soil and eating the leaves.



HERMIT CRAB MAZE

Challenge children to create a maze for your hermit crabs using small blocks, cardboard tubes, etc. arranged on a tabletop. Add one or more hermit crabs. Predict the path they will take. Will they go through tunnels? Around obstacles?

MEAL WORMS: Get these at the pet store; they are beetle larva, used for feeding small mammals, reptiles and birds. Keep them in an open container, with the bottom covered in old fashioned oatmeal. A cut apple provides enough food and moisture for them. The children can hold them, watch them shed their skin as they grow, and see them change into beetles. They can be released when you are finished with your study.

TRANSPIRATION: Show children how leaves contain water and release it into the air to clean the air by picking leaves from a bush and putting them in a Zip-loc bag. It doesn't take long for moisture to appear in the bag!

FINGER PRINT FUN: With a No. 2 pencil, color a dark rectangle as big as an index finger's top joint on a piece of paper. Rub your index finger on the place you colored to pick up the graphite on your fingerprint. Take a piece of Scotch tape and place it on your dirty index finger. This should transfer the graphite to the tape, and give you a good finger print. Stick the tape on a clean sheet of paper and use a magnifying glass to study your print.

ROTTING PUMPKIN: SEAL your pumpkin tightly in a large jar and watch it rot over time. This can also be done with food in a zip-seal bag sealed with duct tape.
It is interesting to compare bread, cookies, cheese, meat, applesauce, etc. The children can keep a journal drawing recording the changes. This is gross, but interesting!

SENSORY TABLE IDEAS

Ice Sculpture: Freeze ice in lots of different containers, including ice trays. Put these in the water table with some salt shakers. The table salt will cause the ice to stick together. Add some cups of colored water and pipettes to drip on the structure.
Rice, magnet chips and magnet wands
Scent the water
Oatmeal (dry), flax seed or other seeds
Potting soil, water and animals, tractors
Colored rice or macaroni (color the rice in zip-loc bags with rubbing alcohol and food coloring and let dry)
Pine cones and feathers
Carrots/ Potatoes - wash and grate
Moon Sand (It sculpts like wet sand, but is dry!)
Eye droppers and water
Turkey basters and water
Magnets and water
Plastic tubing
PVC Pipe with marbles
Funnels
Earthworms
Ivory Soap and scrubbies
Food coloring pellets
Bath fizz balls

SENSORY SUBSTANCES

GLARCH: 1 cup white glue, 1 cup liquid starch. Pour starch over glue and fold together. Once glue solidifies, pour off the starch. This becomes harder and more rubbery as it is worked. When the mixture becomes quite solid, pour off excess starch.

OOBLECK: 2 cups warm water, 3 cups corn starch. Mix together in a bowl. This mixture is solid when resting, but turns liquid when handled.

CLEAN MUD: Mix together torn toilet paper, hand-grated Ivory soap and water. Let soak. Squish and squash, clean mud!